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EXAMINER

BLOOM, NATHAN J

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

08/07/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/528,533

**Applicant(s)**

NEW ET AL.

**Examiner**

NATHAN BLOOM

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05/06/2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20, 21 and 23-39 is/are rejected.
- 7) ☐ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Applicants' response to the last Office Action, filed on May 6<sup>th</sup>, 2009 has been entered and made of record.

***Response to Amendment***

2. The previously presented 35 USC 112 rejection of claim 38 has been withdrawn due to the fact that Applicants' amendment to the claim has successfully overcome the previously presented 35 USC 112 rejections.

***Response to Arguments***

3. Applicant's arguments with respect to the newly amended claims rejected under the previous prior art have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 101***

4. The method claim (claim 38) of this application specifically requires an optical device to perform the transformation, and thus passes the machine and transformation test (*in re Bilski*).

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 20-21, 23-25, 27-31, 33-36, and 38-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilkinson (WO 99/31563).

Instant claim 20: An optical correlator [*Wilkinson has taught an optical correlator (joint transform correlator) on page 12 lines 1-12.*] having an image production device [*Page 12 lines 1-12 (ferroelectric liquid crystal SLM), item 1 of figure 1*], an image capture device [*Page 12 lines 1-12 (CCD camera), item 5 of figure 1*)] and an optical device for providing a Fourier transform of image information [*Same section (lens), item 3 of figure 1.*] on the image production device at the image capture device, wherein the image production device and image capture device are disposed in a common plane, [*See figure 1 wherein these components reside in a line, and thus are at least partially disposed on a common plane.*] the optical correlator further having circuitry for applying reference image data and scene image data to the image production device so that scene and reference image data are displayed side-by-side as the joint image, and the optical device is disposed to receive light from the joint image thereby to form a joint power spectrum from the joint image at the image capture device. [*Wilkinson has taught in pages 12-13 the joint image correlation (joint transform correlator) of an input and reference image using the above described devices, and has further taught on page 13 the formation of the joint power spectrum of the joint image at the image capture device.*]

Instant claim 21: The optical correlator of claim 20, wherein the image production device and the image capture device are integrated on a common substrate. [*As per the discussion of claim*

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*20 the devices for image production and capture are a FLC SLM and a CCD type camera device, both of which are common devices in their particular field and thus inherently contain (definition of common – not rare or unusual) "common" materials such as silicon for the substrate.]*

Instant claim 23: The optical correlator of claim 20, wherein the image production device has plural image production elements, the image capture device has plural image capture elements and each image production element includes an image capture element. *[Wilkinson has taught in page 12 lines 1-12 a SLM with 128x128 pixels and an imager with 768x548. Thus for each production element (SLM element) there is included at least one image capture element.]*

Instant claim 24: The optical correlator of claim 20, wherein the image production device and the image capture device are spatially separate. *[Figure 1 of Wilkinson depicts the two devices (SLM and CCD) as two separate entities (page 12 lines 1-12).]*

Instant claim 25: The optical correlator of claim 20, wherein the optical device comprises at least one positive power optical device arranged to receive light from the image production device and to pass light back to the image capture device. *[(Note: A positive power optical device is one that causes convergence of the light from the device.) As per the above discussion and the*

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*device of figure 1, Wilkinson has taught a lens (item 3 of figure 1) that collimates (promotes convergence of the light – reduces spreading effect) the light as it passes through.]*

Instant claim 27: The optical correlator of claim 25, wherein the positive power optical device comprises a planar mirror and a positive power lens. *[See the alternative embodiment of Wilkinson in figure 5 that utilizes a planar mirror and collimated lenses (items 39, 37, and 23 of figure 5).]*

Instant claim 28: The optical correlator of claim 20, having circuitry for applying reference image data to one part of the image production device, and circuitry for providing reference scene data of the image production device. *[As per the discussion of claim 20 the formation of a joint image at the SLM has been taught by Wilkinson.]*

Instant claim 29: The optical correlator of claim 20, wherein the image production device is operable to provide phase modulation of incident light according to applied image data. *[Wilkinson has taught on pages 3 and 12 the phase-encoding of the light with a checkerboard pattern to enhance the spatial light modulation and camera operation.]*

Instant claim 30: The optical correlator of claim 20, wherein the image production device has two output levels only. [*Wilkinson has taught the binarized operation of the SLM on page 12 lines 13-28.*]

Instant claim 31: The optical correlator of claim 20, wherein the image production device comprises a ferroelectric liquid crystal on silicon spatial light modulator. [*See the discussion of claim 20.*]

Instant claim 33: The majority of the limitations of instant claim 33 are encompassed by the limitations of claim 20, as such the limitations of claim 33 corresponding with those of claim 20 have been disclosed by the cited prior art. Additionally, the thresholding step required by claim 33 has been disclosed by Wilkinson on page 14 lines 1-12.

Instant claim 34: The joint transform correlator of claim 33, wherein the threshold is formed from the electrical signals of at least one pixel adjoining the said pixel. [*Wilkinson has taught that the thresholding is based on values of the pixel and its nearest neighbors (page 14 lines 1-12).*]

Instant claim 35: The joint transform correlator of claim 33, comprising a pixellated image production device, wherein the processing circuitry is constructed and arranged to provide each output signal per pixel to a respective pixel of the image production device. *[The image production device (SLM) as discussed by claim 20 inherently provides image data on a per pixel basis.]*

Instant claim 36: The joint transform correlator of Claim 35, having output circuitry for reading out unprocessed information from each pixel of the image capture device. *[As per the above discussion of claims 34-35 the image data read in by the system is then processed by thresholding. Thus, Wilkinson has taught the reading of unprocessed image information from each pixel and then further processing said data. ]*

Instant claim 38: A method of correlating at least one input image with at least one reference image, the method comprising:

illuminating a joint representation of the input image and the reference image with coherent light to provide a first light beam; and, *[Wilkinson has taught the illumination of a joint image with a laser beam in page 12 and page 13 lines 6-11.]*

passing the first light beam to an optical device disposed to provide a second image at a plane, the second image being a Fourier transform of the joint representation of input image and reference image, *[Page 13 lines 6-11 (lens cases Fourier transform of joint image).]*



wherein the second image is formed co-planar with the joint representation of the input image and reference image. *[Wilkinson has only taught a single image capture device, and thus both the 1<sup>st</sup> and 2<sup>nd</sup> images will be formed on the same SLM device.]*

Instant claim 39: An integrated circuit comprising a liquid crystal on silicon spatial light modulator and an image capture device, the spatial light modulator having an array of light modulating elements and the image capture device having an array of light capture elements, wherein each light capture element is arranged to provide an output representative of the light picked up by the respective capture element *[See the discussion of claims 20 and 33.]*, the integrated circuit further having processing circuitry for each capture element constructed and arranged to process the output of the said capture element together with the output of at least a respective one other capture element and to provide a first output from each capture element in response to such processing, the capture array further having output circuitry for outputting the unprocessed output of each capture element. *[See the discussion of claims 33 and 34.]*

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson as applied to claims 20 and 25 above.

Instant claim 26: The optical correlator of claim 25, wherein the positive power optical device comprises a curved mirror. *[As per the discussion of claim 25 the use of convergent optical devices was taught by Wilkinson, but Wilkinson has only taught the use of a single mirror type in figure 5. However, Examiner takes official notice that it was well known to one of ordinary skill in the art at the time of the invention to utilize an equivalent convergent mirror device such as a concave curved mirror to reflect and converge the light. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Wilkinson with the knowledge of one of ordinary skill in the art to utilize and substitute known mirror types that fit the requirements of the taught optical correlating device of Wilkinson.]*

9. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson as applied to claim 20 above, and in further view of O'Callaghan (US 6369933).

Instant claim 32: The optical correlator of claim 20, wherein the image production device comprises one from the group comprising a nematic liquid crystal on silicon spatial light modulator, a pi-cell spatial light modulator and a microelectromechanical systems (MEMS) spatial light modulator. *[Wilkinson has not taught an SLM device from this list of devices, but O'Callaghan has taught an optical correlator with various SLM devices. In particular, in*

*column 6 lines 41-56 (nematic liquid crystal) O'Callaghan has evidenced that such an SLM device was well known to one of ordinary skill in the art at the time of the invention. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a known SLM device as taught by O'Callaghan for the SLM device taught by Wilkinson with a reasonable expectation for success in generating the image using an SLM device.]*

10. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson as applied to claims 20 and 35-36 above, and further in view of Yamazaki (US 2001/0019130).

Instant claim 37: The joint transform correlator of claim 36, wherein the pixellated image production device is integrated on the same substrate as the image capture device. *[Wilkinson has taught an optical correlation device with an image production device and an image capture device, but has not specified the particular materials of these devices as the same type of substrate. However, Yamazaki has taught a device for capturing and displaying light on the same substrate in paragraph 0009. Furthermore, the claim language as currently provided only requires that the substrate be the same material, and not that the devices reside on the same chip. The teachings of Yamazaki identify that the same substrate material can be used to for both capturing and displaying light images, and that they can reside on the same chip. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Wilkinson to display the image on the same type of substrate as used for capture device in order to reduce cost by utilizing similar materials.]*

*Allowable Subject Matter*

11. Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Instant claim 22 further requires that the production and capture device share the same region (pixels of the devices are interspersed with one another), which further requires that the devices share the same plane and not just a few points within the same plane.

*Conclusion*

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Friday from 10:00 am to 6:30 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Matthew C Bella/

Supervisory Patent Examiner, Art Unit 2624